

## 5. TRAVEL TIME STUDIES OF ORIGIN-DESTINATION PAIRS

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This section describes travel time surveys between selected origin and destination points for auto, transit, bicycle and HOV lane trips. The purpose of these studies is to evaluate the comparative performance of various transportation modes for the Annual Performance Report required by the CMP. These paired surveys, which were run simultaneously in the same corridor, provide insight into journey-to-work travel times between major employment centers and residential areas in Alameda County. Both auto and transit trips were surveyed for ten O-D pairs, eight during the P.M. peak period, and two during the A.M. peak period, including one where HOV lanes were used. In addition, bicycle travel times were recorded for one origin-destination pair between Emeryville and Berkeley.

Ten origin-destination (O-D) pairs have been selected by the CMA Board and by ACTAC to simulate typical commute trips on the County's major travel corridors. The first five pairs were surveyed in 1996, 1997, 1998, 2000 and 2002. Four additional O-D pairs were surveyed for the first time in 1998. An additional survey of HOV lane travel times was added for one of the O-D pairs (Fremont to San Jose) in 2000. These ten trip combinations, and the specific routes that were followed, are listed in Table 10.

In 2004, changes were made to four (4) O-D pairs (1, 3, 5, and 8) to accommodate changes in transit service in Newark, Livermore and Pleasanton. The new destinations were selected to be as close to the previous destination as possible, in a residential area, and approximately the same distance from the previous transit station or bus stop. However, for the purpose of assessing trends, these four (4) pairs are not included in the analysis. The revised route descriptions are shown in Table 10 and the results are shown in Table 12.

This year for the second time, auto travel time on the 3 bay bridges in Alameda County is included in the LOS Monitoring Report. While the travel time does not represent a true "home" to "work" origin-destination pair, it does provide information on travel time across the Bay for monitoring purposes. The travel times are provided by Caltrans and are for mainline travel only, excluding any delay due to ramps. The data is for 2003 and is the most recent available. Caltrans has indicated that this data will be collected again only if resources are available. The end points were between I-880 and I-80 in Alameda County and SR 101 in San Francisco and San Mateo Counties.

**Table 10**  
**Travel Routes for the Alameda County O-D Pairs - PM Peak Hour**

#	Peak Period	Origin	Destination	Transit/Bus Route	Highway Travel
1	P.M.	<b>Hayward</b> Kaiser Med. Ctr, 27400 Hesperian.	<b>Newark</b> 1996-2002: Residence near Lafayette St at Newark Blvd. 2004: Residence near Thornton Ave. and Ruschin Drive.	1996-2002: Walk to Hesperian, AC 97 to AC 29, at Union City BART Stn., to Newark/Lafayette, walk to door. 2004: Walk to Hesperian, AC 97 to AC 232, at Union City BART Stn., to Cedar/Thornton, walk to door.	1996-2002: Walk to parking; Hesperian to Union City Blvd., to Newark Blvd., to Lafayette St.; park and walk to door. 2004: Walk to parking; Hesperian to Tennyson to I-880; exit Thornton to Ruschin; park and walk to door.
2	P.M.	<b>Emeryville</b> Chiron Office Bldg., 4560 Horton St., near 53rd & Hollis Sts.	<b>Berkeley</b> Residence near Marin Circle at Los Angeles Ave.	Walk to 53rd and San Pablo, AC 72 or 73 to AC 43 at Solano Way, exit at Marin Circle, walk to door.	Walk to parking; 53rd St. to San Pablo Avenue, to Hopkins Street, to Marin Circle; park and walk to door.
3	P.M.	<b>Hayward</b> Cal State University at Carlos Bee Ave.	<b>Livermore</b> 1996 – 2002: Residence near Portola and North Livermore Avenue. 2004: Residence near Delaware Way and North Murrieta.	1996-2002: Walk to AC 92, to Hayward BART, BART to Dub/Pleas Station, Wheels 12 to Portola & N. Murieta, walk to Portola and North Livermore Ave; walk to door. 2004: Walk to AC 92, to Hayward BART, BART to Dub/Pleas Station, Wheels 12 or 12X to N. Murieta and Portola; walk to door.	1996-2002: Walk to parking; Carlos Bee, to Mission Blvd, to "A"/Redwood, to I-580, to Portola exit, to N Livermore Ave.; park & walk to door. 2004: Walk to parking; Carlos Bee, to Mission Blvd, to Grove Way, to I-580 EB, to Portola exit, to Hurton to Delaware Way; park and walk to door.
4	P.M.	<b>Oakland</b> Downtown Oakland 1333 Broadway building	<b>San Leandro</b> Residence near Farnsworth St. and Chapel Ave.	Walk to BART 12th St. Station; BART to San Leandro Station, to AC 84, walk to door.	Walk to parking; local streets to I-880, to Marina Blvd, to Chapel Avenue; park and walk to door.

**Table 10 (Continued)**  
**Travel Routes for the Alameda County O-D Pairs - PM Peak Hour**

#	Peak Period	Origin	Destination	Transit/Bus Route	Highway Travel
5	P.M.	<b>Fremont</b> NUMMI Plant 45500 Fremont Blvd.	<b>Pleasanton</b> 1996 – 2002: Residence near Valley Ave. and Greenwood Rd. 2004: Residence near Hansen and Valley Ave.	1996 – 2002: Walk to AC 22 to Fremont BART, BART to Dubl/Pleas Station, Wheels 10 to Greenwood Road and Valley Avenue, walk to door. 2004: Walk to AC 212 or 218 to Fremont BART, BART to Dubl/Pleas Station, Wheels 7 or 8 to Valley Avenue, walk to door.	1996 –2002: From parking to Fremont Blvd to Durham Road to I-680 to Sunol Blvd to Greenwood Rd.; park and walk to door. 2004: : From parking to Fremont Blvd to Durham Road to I-680 to Bernal Ave. exit; to Valley Ave. to Hansen; park and walk to door.
6	A.M.	<b>Fremont</b> Residence near Thornton Ave. at Fremont Blvd.	<b>San Jose</b> Fujitsu, 3801 Zanker Road at Tasman	1998-2002: Walk to AC 27, transfer to SCVTA 140 at Fremont BART, walk to door. 2004: Walk to AC 218; transfer to SCVTA 180 at Fremont BART; transfer to SCVTA 33; exit at Zanker; walk to door.	From residential driveway to Thornton, to I-880, to SR 237, to Zanker; park and walk to door.
7	A.M.	<b>Fremont</b> Residence near Thornton Ave. at Fremont Blvd.	<b>San Jose</b> Fujitsu, 3801 Zanker Road at Tasman	Future transit service.	HOV: From residential driveway to Thornton, to I-880 HOV lanes, to SR 237, to Zanker; park and walk to door.
8	P.M.	<b>Oakland</b> Federal Building., Jefferson at 14 <sup>th</sup>	<b>Pleasanton</b> 1998-2002: Residence near Hopyard Rd. and Valley Ave. 2004: Residence near Valley Ave. at Hansen Dr.	1998-2002: Walk to BART 12 <sup>th</sup> St., BART to Dublin/Pleasanton Station., Wheels 8, walk to door. 2004: Walk to BART 12 <sup>th</sup> St., BART to Dublin/Pleasanton Station., Wheels 7 or 8 to Valley near Hansen, walk to door.	Walk to parking; local streets to I-880 to I-238 to I-580, to Hopyard to Valley; park and walk to door.

**Table 10 (Continued)**  
**Travel Routes for the Alameda County O-D Pairs - PM Peak Hour**

#	Peak Period	Origin	Destination	Transit/Bus Route	Highway Travel
9	P.M	<b>Freemont</b> Washington Hospital at Mowry Avenue.	<b>Alameda</b> Bay Farm Island, Residence near Searidge at Robert Davey.	1998 – 2002: Walk to Fremont BART, BART to Coliseum, AC 49 to Alameda, walk to door.  2004: Walk to Fremont BART; BART to Fruitvale; AC 50 to Alameda; exit at Robery Davey Jr. Dr.; walk to door.	1998-2002: Walk to parking; Mowry to I-880 to Hegenberger, to Doolittle, to Island; park and walk to door.  2004: Walk to parking; Mowry to I-880 to 98 <sup>th</sup> Ave., to Doolittle, to Island Dr. and walk to door.
10	P.M.	<b>Alameda</b> Naval Air Station, Atlantic at Main.	<b>Oakland</b> Business near College Ave. at Lawton.	1998-2002: AC 10 to BART 12 <sup>th</sup> St., BART to Rockridge, walk to door.  2004: AC 63 to BART 12 <sup>th</sup> Street; BART to Rockridge; walk to door.	Walk to parking; Atlantic to Webster, to I-880, to I-980, to SR 24, Claremont exit to Clifton, to Lawton, to College, park and walk to door.

## SURVEY METHODOLOGY

Except for the O-D surveys on the bridges, two surveyors, one driving an auto and one taking transit (or a bicycle in one case), traversed between the designated origin and destination points, documenting their travel times and identifying any anomalies that they encountered during the course of their trip (i.e., a traffic accident). Transit trips were taken either on buses (AC Transit, UC Transit, VTA, Wheels), rail (BART or ACE), or a combination of these modes. The bicycle trip was taken on local streets in Emeryville and Berkeley. Whenever possible, the auto and transit trip started on the same day at the same time. Surveys were conducted on mid-week days (Tuesday through Thursday) during the period between June 1 to June 24, 2004. Most routes were surveyed on two different days. The data for O-D Pairs 1-5 and 8-10 were collected during the P.M. peak period (4:00 to 6:00 P.M.), while O-D Pairs 6 and 7 were surveyed between 7:00 and 9:00 A.M.

Select travel time data were recorded for each trip. Table 11 lists the time components that were noted for each type of trip.

**Table 11**  
**Time Components of Origin-Destination Surveys**

<b>Auto Trip</b>	<b>Transit Trip</b>
<ul style="list-style-type: none"><li>• Start time at origin door (walk)</li><li>• Auto departs parking</li><li>• Merge onto 1<sup>st</sup> freeway</li><li>• Merge onto 2<sup>nd</sup> freeway</li><li>• Exit from freeway</li><li>• Arrive at parking</li><li>• Arrive at destination door (walk)</li></ul>	<ul style="list-style-type: none"><li>• Stat time at origin door (walk)</li><li>• Arrive at first transit stop</li><li>• Board 1<sup>st</sup> bus/rail</li><li>• Exit 1<sup>st</sup> bus/rail</li><li>• Board 2<sup>nd</sup> bus/rail</li><li>• Exit 2<sup>nd</sup> bus/rail</li><li>• Board 3<sup>rd</sup> bus/rail</li><li>• Exit 3<sup>rd</sup> bus/rail</li><li>• Arrive at destination door (walk)</li></ul>

For the analysis of transit trip data, no more than half of a route's scheduled headway was used for the initial waiting time. The actual waiting time was used for all other transit transfers.

The Emeryville-Berkeley O-D Pair 2 was also surveyed by bicycle. Two travel time studies were conducted on this route, one each by two different riders. These data were also collected between 4:00 and 6:00 P.M., on days with good weather, and no incidents or accidents affecting traffic flow. The times do not include parking the bicycle, walking to the final destination, or changing clothes at the work site.



## ORIGIN-DESTINATION SURVEY RESULTS

Table 12 lists the results of the 2004 origin-destination surveys, and also includes a comparison with the previous surveys. OD pairs 1, 3, 5, and 8 are excluded from the analysis because they are not directly comparable to previous year's data. Of the remaining six (6) O-D pairs, auto travel times increased on four routes (Emeryville-Berkeley, Oakland-San Leandro, Fremont-Alameda, Alameda-Oakland) and decreased on two routes (Fremont to San Jose, single occupant vehicle and HOV). Auto travel time between Fremont and San Jose, including travel in HOV lane, has improved significantly for the second monitoring period in a row, 39 percent for single occupant vehicle and 21 percent for HOVs. This may be due to job losses that occurred in computer industry in the Silicon Valley in the past few years.

Transit travel times decreased or stayed the same on three routes (Emeryville-Berkeley, Fremont-San Jose, Alameda-Oakland) and increased on two routes (Oakland-San Leandro, Fremont-Alameda). One O-D pair (Pair 7) is HOV only. The maximum increase in transit travel time occurred between Fremont and Alameda with a 53 minute increase (76 %) compared to 2002. This could be indicative of reduction in transit services.

Travel times for auto and transit for each pair are described in more detail below:

### Auto Times

The 2004 auto travel times for the O-D pairs varied somewhat compared with the surveys from previous years, with times increasing for some O-D pairs and decreasing for others.

The auto travel times on O-D Pairs 1 (Hayward to Newark), 3 (Hayward to Livermore), 5 (Fremont to Pleasanton) and 8 (Oakland to Pleasanton) are not comparable to previous year data because of changes to the destination point of the pair.

The auto travel time on O-D Pair 2 Emeryville-Berkeley, was similar to the average of the previous three years, slightly increasing. The overall travel time increased from 25 minutes to 28 minutes.

The average auto travel times on O-D Pair 4 from Oakland to San Leandro, O-D Pair 9 from Fremont to Alameda O-D Pair 10 from Alameda to Oakland increased compared to the previous monitoring studies. O-D Pair 4, Oakland to San Leandro, increased from 32 to 41 minutes, an increase of 28 percent. This is probably related to increased congestion on I-880 during the evening commute. O-D Pair 9, Fremont to Alameda, increased 21 percent from 53 to 64 minutes since 2002. O-D Pair 10, Alameda to Oakland, results are comparable to 2002 with an increase of only 5 percent in auto travel time.

The single-occupant auto travel time from Fremont to San Jose (O-D Pair 6) during the A.M. peak period decreased by 39 percent, from 49 to 30 minutes. This is the second monitoring period in a row that this O-D Pair has experienced a substantial decrease in travel time. This could be due to job losses in Silicon Valley coupled with improvements to I-880 in the south county area. Vehicles eligible for the high-occupancy vehicle lane (O-D Pair 7) on southbound

I-880 were able to make the trip in 32 minutes, over 10 percent faster than the single occupant vehicles. This pair also has experienced substantial reductions for two successive monitoring periods.

### **Transit Times**

The average 2004 transit travel times generally improved compared to previous years with only the Fremont to San Jose pair increasing substantially. Observations about each O-D pair are listed below.

**O-D Pair 1.** The transit travel time on this route was measured to be 90 minutes in the 2004 surveys. The data is not directly comparable to previous year's data because of changes in the destination. Auto travel time was 16 minutes, over 5 times shorter than transit.

**O-D Pair 2.** The average transit travel time was 53 minutes, comparable to 56 minutes in 2002. Auto travel time was 28 minutes, a twelve (12) percent improvement in auto travel time since the last survey. The bicycle average travel time was 33 minutes, very close to the auto travel time average, showing that bicycles are a competitive transportation alternative on this specific route. Auto travel time was nearly half that of transit.

**O-D Pair 3.** The transit travel time on this route was measured to be 120 minutes in the 2004 surveys. The data is not directly comparable to previous year's data because of changes in the destination. Auto travel time was 61 minutes, about 50 percent shorter than transit.

**O-D Pair 4.** The average transit travel time was 70 minutes, 25 percent higher than the 2002 surveys. Auto travel time was 41 minutes, a 28 percent improvement in auto travel time since the last survey. Auto travel time was less than half that of transit.

**O-D Pair 5.** The transit travel time on this route was measured to be 146 minutes in the 2004 surveys. The data is not directly comparable to previous year's data because of changes in the destination. Auto travel time was 27 minutes, over 5 times shorter than transit.

**O-D Pair 6.** In the 2004 surveys, average transit time was 94 minutes compared to 118 minutes in 2002, a 20 percent improvement. The 2004 auto average time was 30 minutes, about three times faster than transit. The improvement in transit and auto travel time is probably due to a combination of job loss in the computer industry and improvements made in the I-880 corridor in south county.

**O-D Pair 7.** The auto travel time for this route was 27 minutes, a 20 percent improvement in travel time in the HOV lane since 2002. The HOV lane is 10 percent faster than the mixed-flow lanes.

**O-D Pair 8.** The transit travel time on this route was measured to be 77 minutes in the 2004 surveys. The data is not directly comparable to previous year's data because of changes in the destination. Auto travel time was 45 minutes, about 70 percent faster than transit.

**O-D Pair 9.** The average transit travel time was 123 minutes, 76 percent higher than the 2002 surveys. Auto travel time was 64 minutes, a 21 percent improvement in auto travel time since the last survey. Auto travel time was about 50 percent faster than transit.

**O-D Pair 10.** The average transit travel time was 45 minutes, comparable to the 2002 survey. Auto travel time was 22 minutes, a 5 percent improvement in auto travel time since the last survey. Auto travel time was about half that of transit.

### **Bicycle Times**

O-D Pair 2, between Emeryville and Berkeley, shows that on this route, travel time by bicycle can be quite similar and competitive with auto. Bicycle trips for this 4.8 mile segment averaged about 33 minutes, as compared to a 28 minute trip by auto and a 53 minute trip by bus transit. Bicycle commute trips may involve some additional time to deal with bicycle storage and changing clothes, which can add about 5 to 10 minutes to total commute time.

### **Comparison of Travel Modes**

Comparing auto and transit travel times to each other shows that transit services appear to be worsening while auto travel times are improving. In the 2004 surveys, transit travel times range between 2 to over 5 times longer than that of auto travel. Two pairs, Hayward-Newark and Fremont-Pleasanton, have transit travel times that are over 5 times longer than auto. Emeryville-Berkeley, Oakland-San Leandro and Oakland-Pleasanton O-D pairs are the only exceptions whereby transit travel times are less than double of auto and then only slightly so. In the 2000 and 2002 surveys, transit times ranged from 1.3 to around 4 times longer than auto. Most of the transit delay is associated with transfers between lines. This is particularly an issue when the passenger must transfer to a bus line that does not operate at frequent intervals. Actual commuters who regularly use transit are more likely to time their trips to match known bus transfer schedules, and could have lower average travel times than these surveys indicate.



**Table 12**  
**Origin-Destination Pair Travel Times**

O-D Pair	Origin	Destination	Mode	Driving Distance	1998	2000	2002	2004			
					Average (minutes)	Average (minutes)	Average (minutes)	Average (minutes)	No. of Runs	Range of Times	Percent Variation from '02
1*	Hayward	Newark	Auto	11.2 mi	24	22	22	16	4	16	-27%
PM			Transit		88	92	79	90	2	88-92	14%
2	Emeryville	Berkeley	Auto	4.8 mi	25	26	25	28	4	25-31	12%
PM			Transit		61	n/a	56	53	2	53	-5%
			Bike		33	30	30	33	2	33-34	10%
3*	Hayward	Livermore	Auto	34.5 mi	53	45	49	61	3	55-70	25%
PM			Transit		144	152	141	120	2	113-127	-15%
4	Oakland	San Leandro	Auto	10.8 mi	35	29	32	41	4	35-50	28%
PM			Transit		74	64	56	70	2	67-73	25%
5*	Fremont	Pleasanton	Auto	18.0 mi	31	34	33	27	4	23-32	-18%
PM			Transit		130	122	125	146	2	145-147	17%
6	Fremont	San Jose	Auto	14.8 mi	39	55	49	30	4	25-34	-39%
AM			Transit		129	104	118	94	2	79-108	-20%
7	Fremont	San Jose	Auto	14.8 mi	---	35	34	27	4	21-33	-21%
AM			Transit		---	---	---	---	---	---	---
8*	Oakland	Pleasanton	Auto	26.6 mi	58	60	62	45	4	44-47	-27%
PM			Transit		81	96	91	77	2	69-85	-15%
9	Fremont	Alameda	Auto	25.2 mi	50	57	53	64	4	57-69	21%
PM			Transit		86	74	70	123	2	122-124	76%
10	Alameda	Oakland	Auto	6.8 mi	21	17	21	22	4	19-26	5%
PM			Transit		51	47	45	45	2	38-52	0%

\* 2004 data is not directly comparable to previous year's data because of changes in destinations of these four O-D pairs.

## **TRAVEL TIMES ON BAY BRIDGE CROSSINGS**

Travel times on the three bridges to Alameda County are presented for the second time in the 2004 surveys, using auto travel time data collected annually by Caltrans on all the bridges for the morning and evening commute periods. Origin and destination travel times were recorded in the segments between I-880 or I-80 in Alameda County across the bridges to SR 101 in San Francisco and San Mateo Counties. Data represents year 2001 and 2003 travel times, the most recent year for which data is available. The results clearly show directional patterns on the bridges. The peak direction in the morning is westbound and in the evening it is eastbound.

Travel times have decreased on the Dumbarton Bridge since 2001 in both directions and for both peak periods. The most significant decrease is in the a.m. westbound peak direction where the travel time across the Dumbarton Bridge has decreased 56 percent, from 32 minutes to 14 minutes. The San Mateo Bridge shows decreases in all directions except a slight increase ( 1 minute) in the a.m. eastbound non-peak direction. Like the Dumbarton Bridge, the most significant decrease is in the a.m. westbound peak direction where the travel time has decreased 43 percent, from 27 minutes to 15.5 minutes. Per Caltrans, the specific reason for the travel time improvement across the San Mateo Bridge is due to the addition of one lane on each direction that was completed in October 2002. Regarding the travel time improvement across Dumbarton Bridge, it could be due to some commuters getting diverted to the improved San Mateo Bridge to cross the bay.

The Bay Bridge travel times have increased or remained same except for a decrease in the a.m. westbound peak direction where travel time has decreased from 31 minutes to 26 minutes (16 percent). Travel time in the a.m. eastbound non-peak direction remained to be the same as in 2001 (8 minutes). The significant increase was in the p.m. westbound non-peak direction, where it increased 38 percent from 17 minutes to 23.5 minutes. Eastbound p.m. peak direction showed an increase of 7 percent from 14 minutes to 17.5 minutes. The increase in travel time could be due the construction on the Bay Bridge.

### **Analysis of Traffic Volume on Bay Crossings**

An analysis of traffic volumes on the three bridges was done to see how the weekday vs. weekend traffic compares on the Bay Bridge as well as in comparison to the other two bridges connecting to peninsula. The results of the analysis are attached in Appendix B. The graphics on the 'Traffic Volume over 24-hr period' show that the Bay Bridge traffic pattern is very different from the traffic pattern on other two bridges. On the Bay Bridge, the weekend traffic is almost similar to the weekday traffic except that the weekend peak period starts at 11 AM, few hours later than the weekday, but it stays at the same level for a longer period of time, almost up to midnight. Traffic on Dumbarton and San Mateo bridges show a clear AM peak period, approximately from 5 AM to 11 AM, and the weekend traffic volume follows the weekday off peak traffic pattern. The sample analyzed was limited to three weeks data in March 04 for the Average Daily Traffic (ADT) and one day mid-month for the 24-hr traffic graph because the data was not available in electronic format.

**Table 13**  
**Travel Times on Bay Bridge Crossings**

Bridge	Time Period	From	To	2001		2003		Percent Difference
				Segment Travel Time	Total Travel Time	Segment Travel Time	Total Travel Time	
Dumbarton Bridge* (SR 84)	Westbound (toward San Mateo County)							
	A.M.	I-880	Co. Line	25	32	7	14	-56%
	A.M.	Co. Line	US 101	7		7		
	P.M.	I-880	Co. Line	6	12	6	11	-8%
	P.M.	Co. Line	US 101	6		5		
	Eastbound (toward Alameda County)							
	A.M.	US 101	Co. Line	6	12	5	11	-8%
	A.M.	Co. Line	I-880	6		6		
	P.M.	US 101	Co. Line	17	26	14	23.5	-10%
	P.M.	Co. Line	I-880	9		9.5		
San Mateo Bridge* (SR 92)	Westbound							
	A.M.	I-880	Co. Line	20	27	8	15.5	-43%
	A.M.	Co. Line	US 101	7		7		
	P.M.	I-880	Co. Line	8	15	7	14.5	-3%
	P.M.	Co. Line	US 101	7		7.5		
	Eastbound							
	A.M.	US 101	Co. Line	7	13	7	14	8%
	A.M.	Co. Line	I-880	6		7		
	P.M.	US 101	Co. Line	20	39**	7	24	-39%
	P.M.	Co. Line	I-880	19**		17		
Bay Bridge (I-80)	Westbound							
	A.M.	I-580 merge	5 <sup>th</sup> Street off-ramp	--	31	--	26	-16%
	P.M.	I-580 merge	5 <sup>th</sup> Street off-ramp	--	17	--	23.5	38%
	Eastbound							
	A.M.	Sterling St on-ramp	I-580 off-ramp	--	8	--	8	0%
	P.M.	Sterling St on-ramp	I-580 off-ramp	--	14	--	17.5	7%

Note - \* In 2002 report SR 84 was mistakenly reported as San Mateo Bridge and similarly SR 92 was reported as Dumbarton Bridge

\*\*Caltrans corrected the 2001 travel time for SR 92 eastbound p.m. from County Line to I-880 On-Ramp to 19 min from 9 minutes reported in 2002.